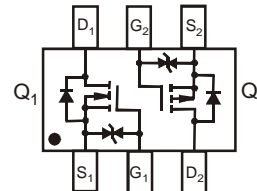


Features

- Low On-Resistance
- Low Gate Threshold Voltage $V_{GS(th)} < 1V$
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- Complementary Pair MOSFET
- Ultra-Small Surface Mount Package
- **Lead Free/RoHS Compliant (Note 2)**
- **ESD Protected Gate**
- "Green" Device (Note 3)
- **Qualified to AEC-Q101 Standards for High Reliability**



SOT-563



TOP VIEW
Internal Schematic

Mechanical Data

- Case: SOT-563
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020C
- Terminal Connections: See Diagram
- Terminals: Finish – Matte Tin annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Marking Information: See Page 6
- Ordering Information: See Page 6
- Weight: 0.006 grams (approximate)

Maximum Ratings N-CHANNEL – Q₁ @T_A = 25°C unless otherwise specified

| Characteristic | Symbol | Value | Unit |
|------------------------|-----------|--|------|
| Drain Source Voltage | V_{DSS} | 20 | V |
| Gate-Source Voltage | V_{GSS} | ±8 | V |
| Drain Current (Note 1) | I_D | 670 480 | mA |
| | | $T_A = 25^\circ C$ $T_A = 85^\circ C$ | |

Maximum Ratings P-CHANNEL – Q₂ @T_A = 25°C unless otherwise specified

| Characteristic | Symbol | Value | Unit |
|------------------------|-----------|--|------|
| Drain Source Voltage | V_{DSS} | -20 | V |
| Gate-Source Voltage | V_{GSS} | ±8 | V |
| Drain Current (Note 1) | I_D | -530 -380 | mA |
| | | $T_A = 25^\circ C$ $T_A = 85^\circ C$ | |

Thermal Characteristics @T_A = 25°C unless otherwise specified

| Characteristic | Symbol | Value | Unit |
|--|-----------------|-------------|------|
| Power Dissipation (Note 1) | P_D | 400 | mW |
| Thermal Resistance, Junction to Ambient (Note 1) | $R_{\theta JA}$ | 312.5 | °C/W |
| Operating and Storage Temperature Range | T_j, T_{STG} | -65 to +150 | °C |

- Notes:
1. Device mounted on FR-4 PCB.
 2. No purposefully added lead.
 3. Diodes Inc.'s "Green" policy can be found on our website at http://www.diodes.com/products/lead_free/index.php.

Electrical Characteristics N-CHANNEL – Q₁ @T_A = 25°C unless otherwise specified

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|-------------------------------------|----------------------|-----|-----|-------|------|--|
| OFF CHARACTERISTICS (Note 4) | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | 20 | — | — | V | V _{GS} = 0V, I _D = 10μA |
| Zero Gate Voltage Drain Current | I _{DSS} | — | — | 1.0 | μA | V _{DS} = 16V, V _{GS} = 0V |
| Gate-Source Leakage | I _{GSS} | — | — | ± 1.0 | μA | V _{GS} = ±4.5V, V _{DS} = 0V |
| ON CHARACTERISTICS (Note 4) | | | | | | |
| Gate Threshold Voltage | V _{GS(th)} | 0.5 | — | 1.0 | V | V _{DS} = V _{GS} , I _D = 250μA |
| Static Drain-Source On-Resistance | R _{DS (ON)} | — | 0.4 | 0.55 | Ω | V _{GS} = 4.5V, I _D = 540mA |
| | | — | 0.5 | 0.70 | | V _{GS} = 2.5V, I _D = 500mA |
| | | — | 0.7 | 0.90 | | V _{GS} = 1.8V, I _D = 350mA |
| Forward Transfer Admittance | Y _{fs} | 200 | — | — | mS | V _{DS} = 10V, I _D = 0.2A |
| Diode Forward Voltage (Note 4) | V _{SD} | 0.5 | — | 1.2 | V | V _{GS} = 0V, I _S = 115mA |
| DYNAMIC CHARACTERISTICS | | | | | | |
| Input Capacitance | C _{iSS} | — | — | 150 | pF | V _{DS} = 16V, V _{GS} = 0V f = 1.0MHz |
| Output Capacitance | C _{oSS} | — | — | 25 | pF | |
| Reverse Transfer Capacitance | C _{rSS} | — | — | 20 | pF | |

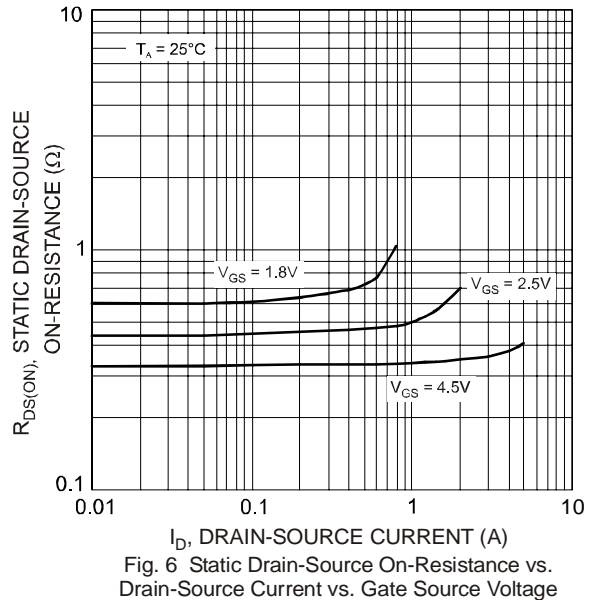
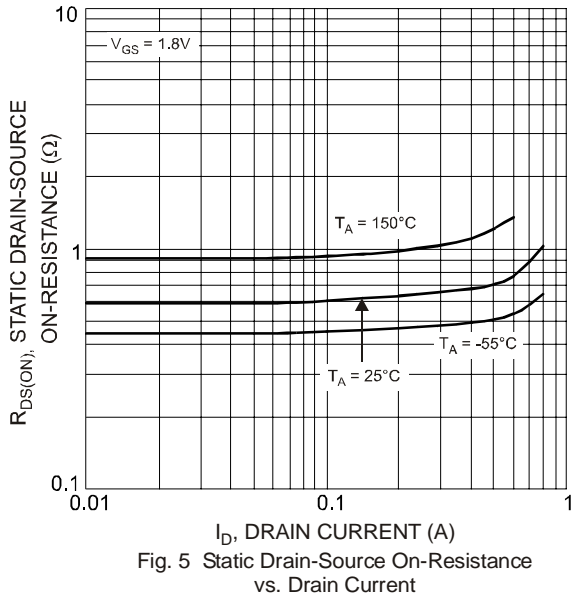
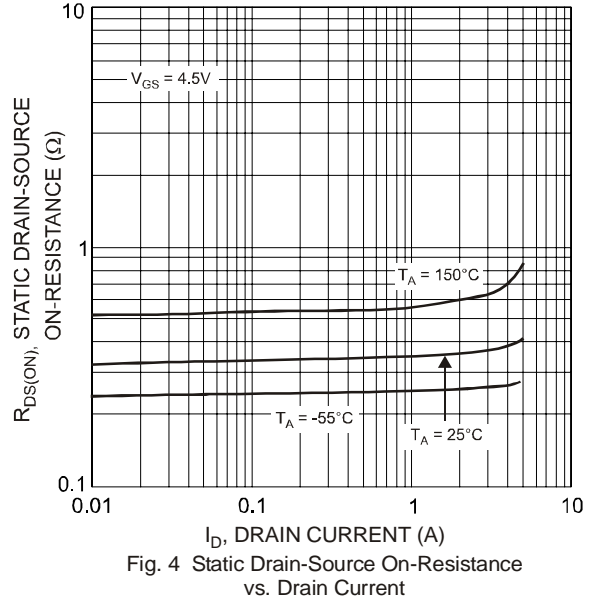
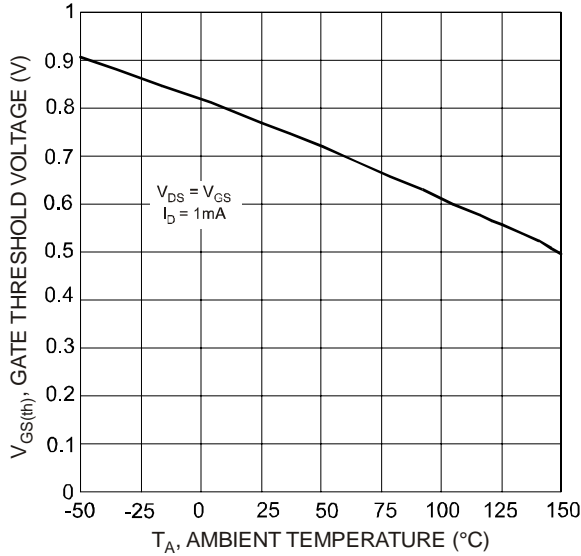
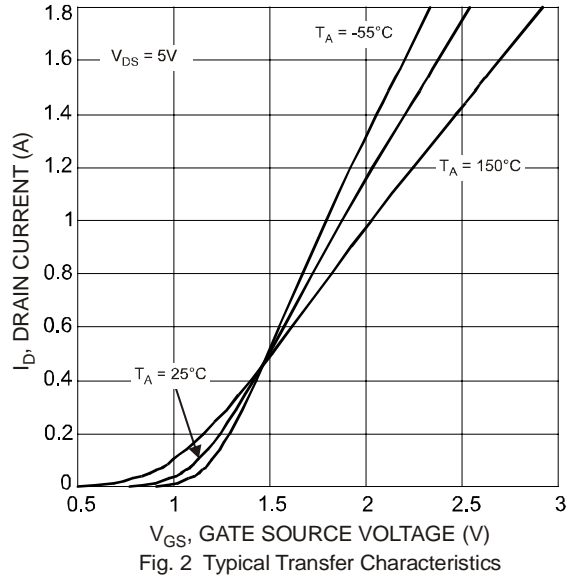
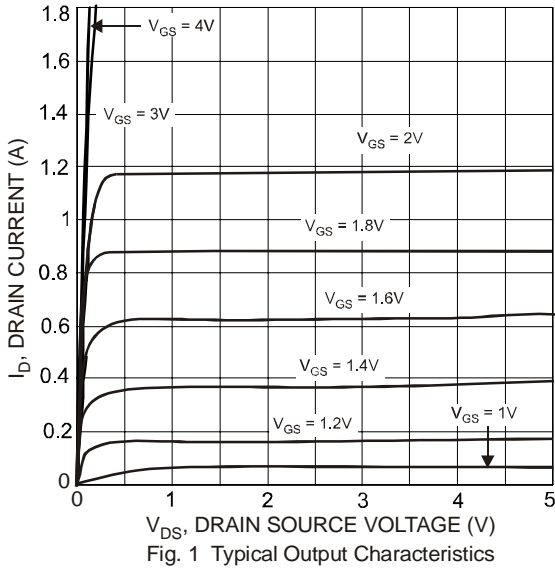
Electrical Characteristics P-CHANNEL – Q₂ @T_A = 25°C unless otherwise specified

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|-------------------------------------|----------------------|------|-----|-------|------|---|
| OFF CHARACTERISTICS (Note 4) | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | -20 | — | — | V | V _{GS} = 0V, I _D = -250μA |
| Zero Gate Voltage Drain Current | I _{DSS} | — | — | -1.0 | μA | V _{DS} = -20V, V _{GS} = 0V |
| Gate-Source Leakage | I _{GSS} | — | — | ± 1.0 | μA | V _{GS} = ±4.5V, V _{DS} = 0V |
| ON CHARACTERISTICS (Note 4) | | | | | | |
| Gate Threshold Voltage | V _{GS(th)} | -0.5 | — | -1.0 | V | V _{DS} = V _{GS} , I _D = -250μA |
| Static Drain-Source On-Resistance | R _{DS (ON)} | — | 0.7 | 0.9 | Ω | V _{GS} = -4.5V, I _D = -430mA |
| | | — | 1.1 | 1.4 | | V _{GS} = -2.5V, I _D = -300mA |
| | | — | 1.7 | 2.0 | | V _{GS} = -1.8V, I _D = -150mA |
| Forward Transfer Admittance | Y _{fs} | 200 | — | — | mS | V _{DS} = 10V, I _D = 0.2A |
| Diode Forward Voltage (Note 4) | V _{SD} | -0.5 | — | -1.2 | V | V _{GS} = 0V, I _S = -115mA |
| DYNAMIC CHARACTERISTICS | | | | | | |
| Input Capacitance | C _{iSS} | — | — | 175 | pF | V _{DS} = -16V, V _{GS} = 0V f = 1.0MHz |
| Output Capacitance | C _{oSS} | — | — | 30 | pF | |
| Reverse Transfer Capacitance | C _{rSS} | — | — | 20 | pF | |

Notes: 4. Short duration pulse test used to minimize self-heating effect.

Q1, N-CHANNEL

NEW PRODUCT



Q1, N-CHANNEL, continued

NEW PRODUCT

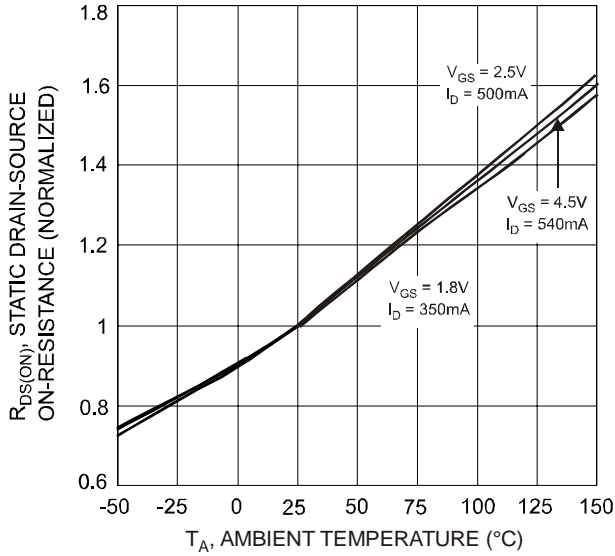


Fig. 7 Static Drain-Source On-State Resistance vs. Ambient Temperature

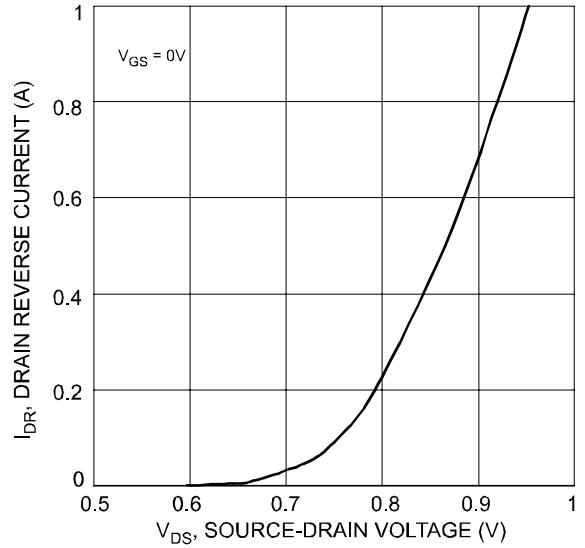


Fig. 8 Drain Reverse Current vs. Source-Drain Voltage

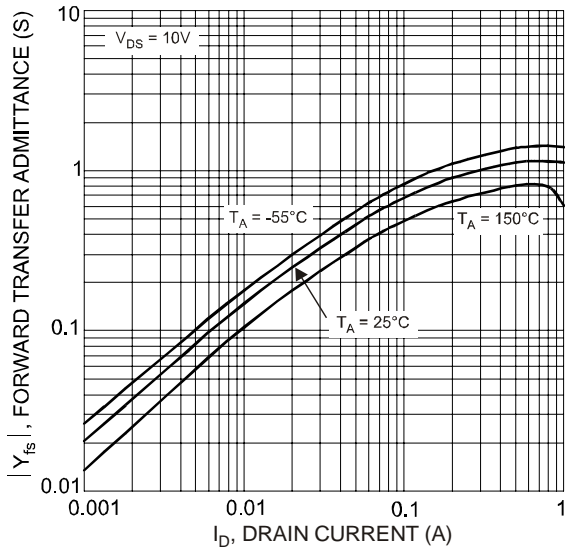


Fig. 9 Forward Transfer Admittance vs. Drain Current

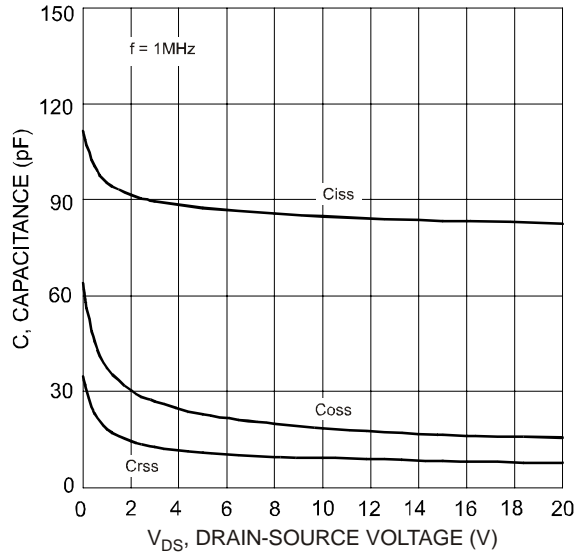


Fig. 10 Typical Capacitance

Q₂, P-CHANNEL

NEW PRODUCT

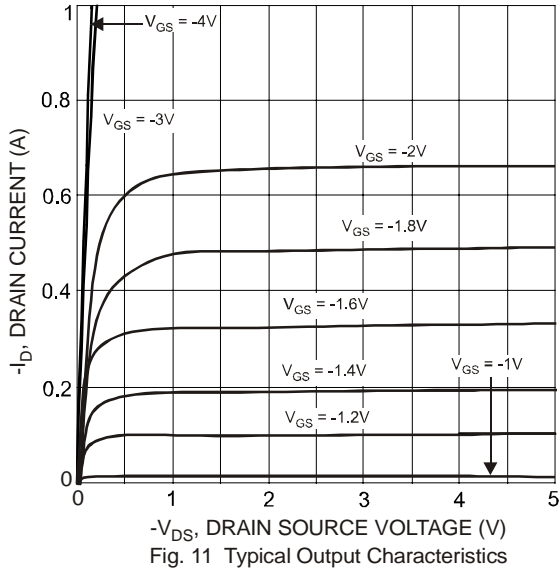


Fig. 11 Typical Output Characteristics

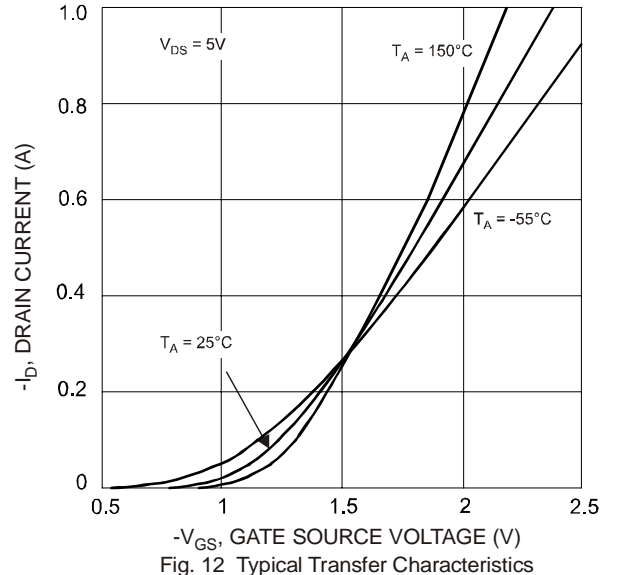


Fig. 12 Typical Transfer Characteristics

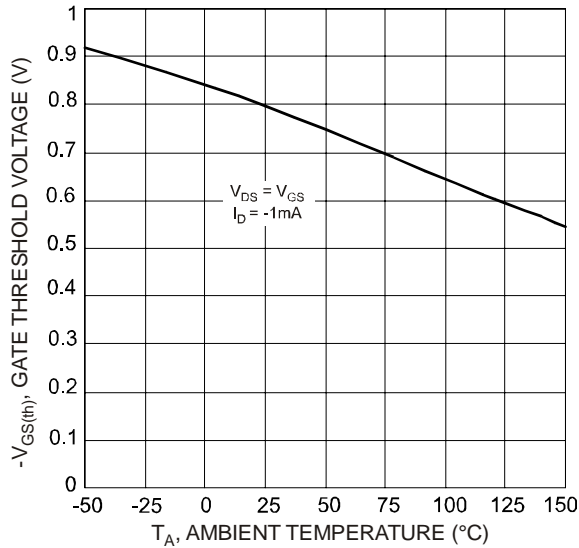


Fig. 13 Gate Threshold Voltage vs. Ambient Temperature

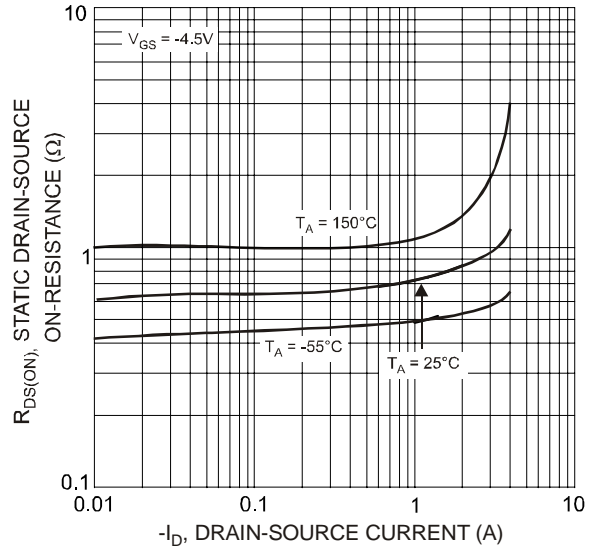


Fig. 14 Static Drain-Source On-Resistance vs. Drain Current

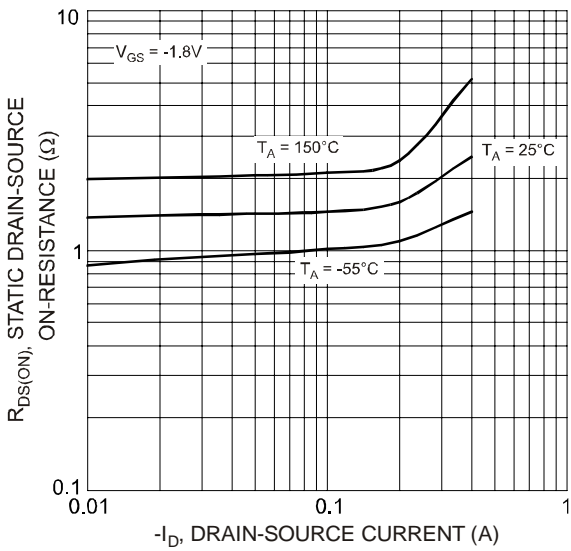


Fig. 15 Static Drain-Source On-Resistance vs. Drain Current

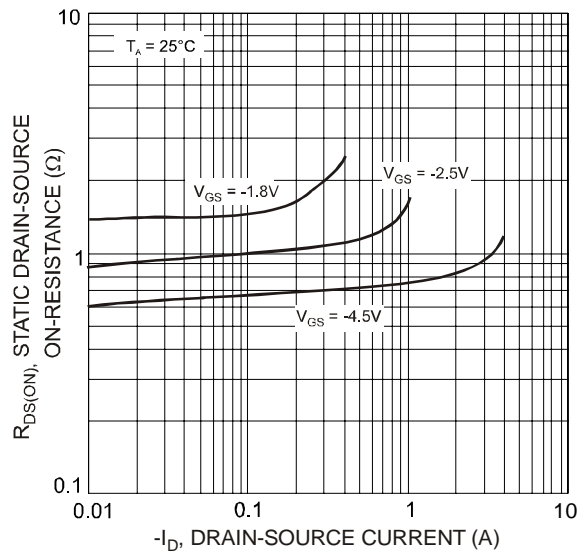


Fig. 16 Static Drain-Source On-Resistance vs. Drain-Source Current vs. Gate Source Voltage

Q₂, P-CHANNEL, Continued

NEW PRODUCT

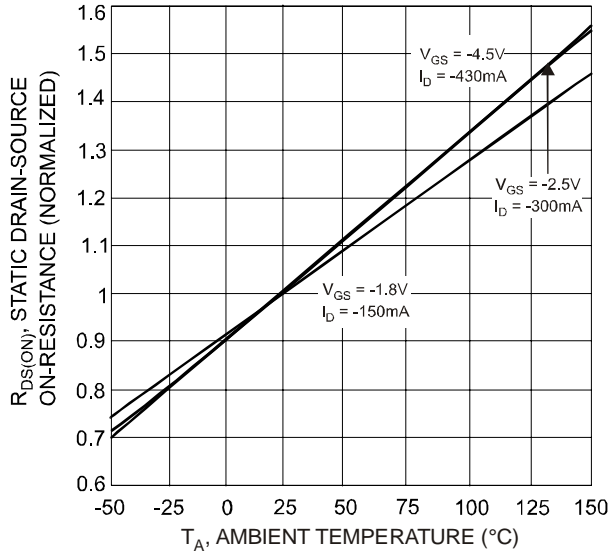


Fig. 17 Static Drain-Source On-State Resistance vs. Ambient Temperature

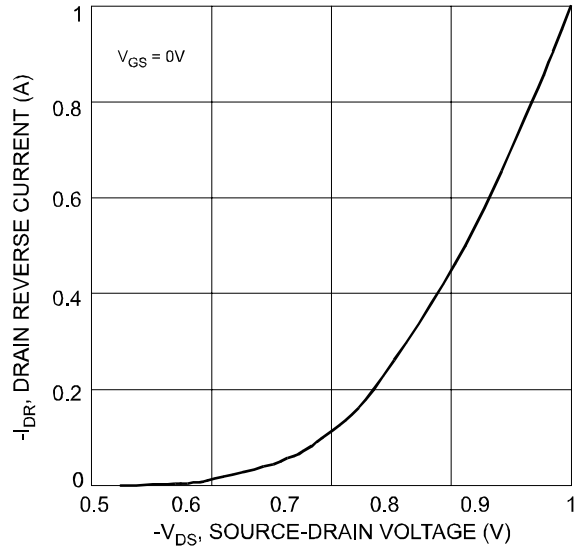


Fig. 18 Drain Reverse Current vs. Source-Drain Voltage

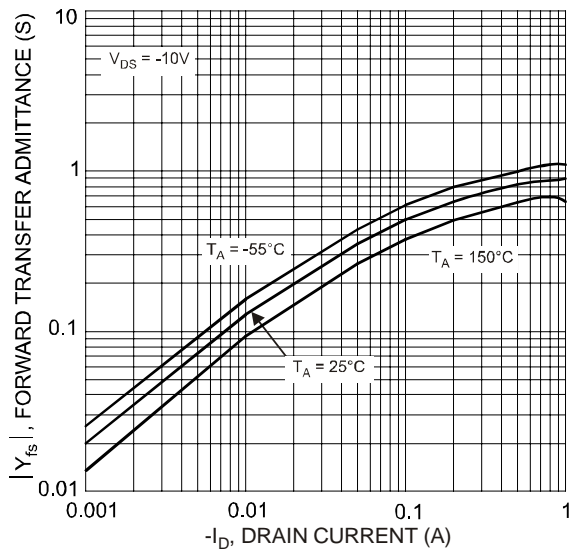


Fig. 19 Forward Transfer Admittance vs. Drain Current

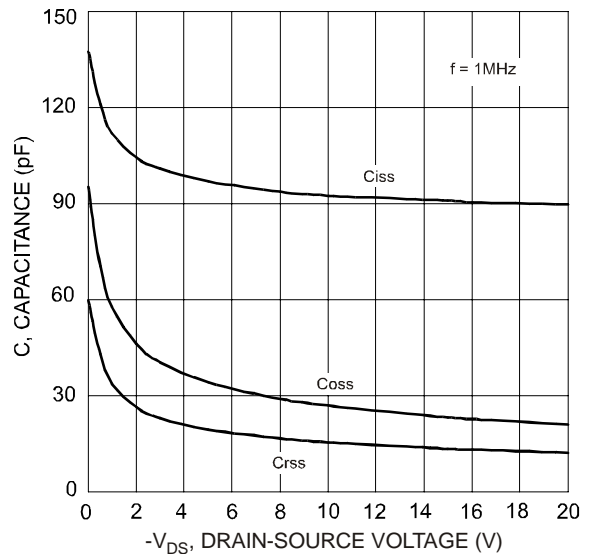


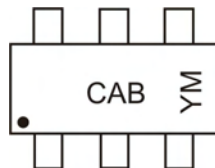
Fig. 20 Typical Capacitance

Ordering Information (Note 5)

| Part Number | Case | Packaging |
|-------------|---------|------------------|
| DMC2004VK-7 | SOT-563 | 3000/Tape & Reel |

Notes: 5. For packaging details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

Marking Information



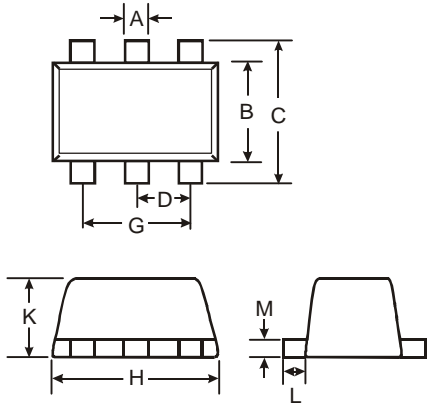
CAB = Product Type Marking Code
YM = Date Code Marking
Y = Year ex: U = 2007
M = Month ex: 9 = September

Date Code Key

| Year | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|------|------|------|------|------|------|------|
| Code | U | V | W | X | Y | Z |

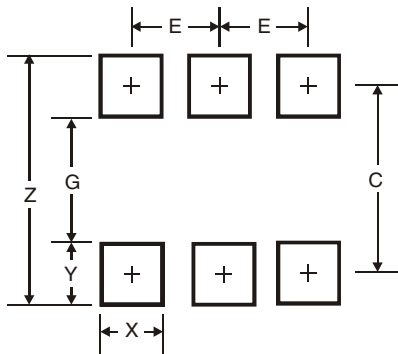
| Month | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Code | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | O | N | D |

Package Outline Dimensions



| SOT-563 | | | |
|----------------------|------|------|------|
| Dim | Min | Max | Typ |
| A | 0.15 | 0.30 | 0.20 |
| B | 1.10 | 1.25 | 1.20 |
| C | 1.55 | 1.70 | 1.60 |
| D | 0.50 | | |
| G | 0.90 | 1.10 | 1.00 |
| H | 1.50 | 1.70 | 1.60 |
| K | 0.55 | 0.60 | 0.60 |
| L | 0.10 | 0.30 | 0.20 |
| M | 0.10 | 0.18 | 0.11 |
| All Dimensions in mm | | | |

Suggested Pad Layout



| Dimensions | Value (in mm) |
|------------|---------------|
| Z | 2.2 |
| G | 1.2 |
| X | 0.375 |
| Y | 0.5 |
| C | 1.7 |
| E | 0.5 |

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